


Helping Massachusetts Municipalities Create a Greener Energy Future



COMMONWEALTH OF MASSACHUSETTS
 Deval L. Patrick, Governor
 Richard K. Sullivan, Jr., Secretary
 Mark Sylvia, Commissioner

Making the Most of a Municipal Energy Audit
 Aimee Powelka
 Municipal Efficiency Coordinator
 Green Communities Division

Webinar
 January 5, 2011
 10:00 am

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Green Communities Division
 Serves as the hub for all Massachusetts cities and towns on energy matters



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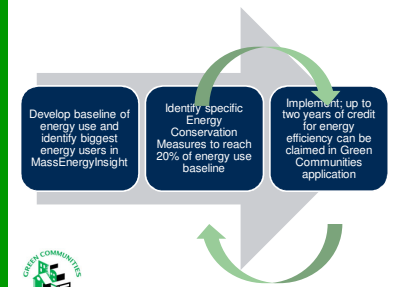
Green Communities Division Programs & Resources for Municipalities

- Green Communities Grant and Planning Assistance Program
- MassEnergyInsight Energy Tracking and Analysis Tool
- Municipal Energy Efficiency Program
- Energy Management Procurement Assistance
 Eileen McHugh, Eileen.McHugh@state.ma.us
- ARRA Stimulus Funding
- Website filled with tools & resources for municipalities:
www.mass.gov/energy/greencommunities
- Email updates via listserv – Sign up today by sending an email to:
join-ene-greencommunities@listserv.state.ma.us

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Energy Audits Enable Green Communities

41 of 53 Green Communities participated in the Energy Audit Program



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OUTREACH - REGIONAL COORDINATORS

- Regional Coordinators act as direct liaisons with cities and towns on energy efficiency and renewable energy activities
- Located at each of the DEP Regional Offices:

SERO – LAKEVILLE: Seth Pickering
 • Seth.Pickering@state.ma.us

NERO – WILMINGTON: Joanne Bissetta
 • Joanne.Bissetta@state.ma.us

CERO – WORCESTER: Kelly Brown
 • Kelly.Brown@state.ma.us

WERO – SPRINGFIELD: Jim Barry
 • Jim.Barry@state.ma.us









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Recording & Presentation

- The webinar is being recorded and will be available and will be posted on our website in approximately 48 hours at:
www.mass.gov/energy/greencommunities
- The slide presentation will also be posted at:
www.mass.gov/energy/greencommunities
- Websites are also listed at end of presentation

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Why Energy Efficiency?

- Join the half of Mass municipalities that have signed up for an energy audit since 2008
- Save money
- Demonstrate community fiscal responsibility
- Save municipal jobs
- Increase energy independence and security
- Create local construction jobs
- Improve occupant/worker comfort and productivity




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Making the Most of An Energy Audit



1. Track your energy usage
2. Discuss your goals, resources and potential funding sources
3. Meet with your Program Administrators/utilities to define the audit services
4. **Conduct an audit**
5. Create a plan
6. Implement

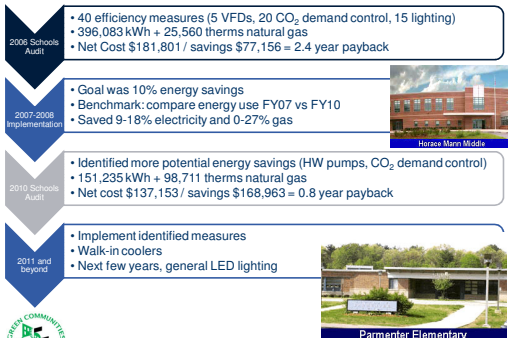


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Franklin: Re-investing in EE



2006 Schools Audit

- 40 efficiency measures (5 VFDs, 20 CO₂ demand control, 15 lighting)
- 396,063 kWh + 25,560 therms natural gas
- Net Cost \$181,801 / savings \$77,156 = 2.4 year payback

2007-2008 Implementation

- Goal was 10% energy savings
- Benchmark: compare energy use FY07 vs FY10
- Saved 9-18% electricity and 0-27% gas

2010 Schools Audit


- Identified more potential energy savings (HW pumps, CO₂ demand control)
- 151,235 kWh + 98,711 therms natural gas
- Net cost \$137,153 / savings \$168,963 = 0.8 year payback

2011 and beyond

- Implement identified measures
- Walk-in coolers
- Next few years, general LED lighting

Hersey Mann Middle

Parmenter Elementary




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Poll

My town/organization has:

- Already implemented all of its audit recommendations
- Had an audit in the last two years
- Signed up for an audit
- Is thinking about having an audit
- Hasn't begun



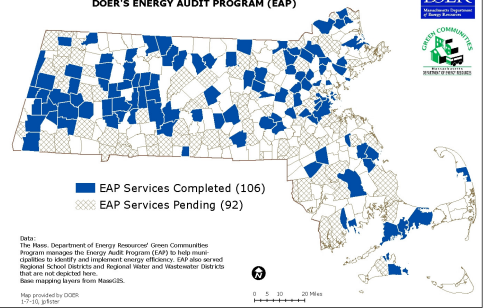
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Mass Munis Receiving Energy Audits


MUNICIPALITIES PARTICIPATING IN DOER'S ENERGY AUDIT PROGRAM (EAP)




■ EAP Services Completed (106)
□ EAP Services Pending (92)

Data:
The Mass. Department of Energy Resources' Green Communities Program manages the Energy Audit Program (EAP) to help municipalities to identify and implement energy efficiency. EAP also serves Regional School Districts and Regional Water and Wastewater Districts that are not depicted here.
See map legend for more details.

Map provided by DER
12-10-2010



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Making the Most of An Energy Audit

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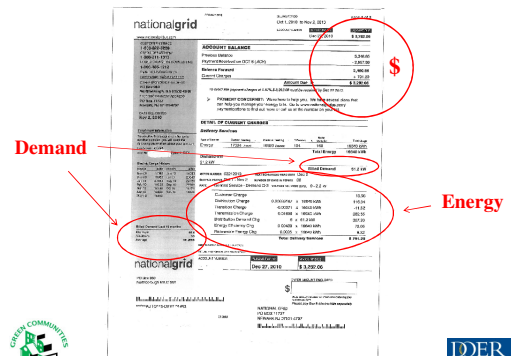


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Understanding Your Electric Bill



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Understanding Your Electric Bill: Energy

- Energy (kWh)
- Rates vary by provider, service class, and area
- Rates vary over time
- Energy Efficiency – to Program Administrators
- Renewable Energy – to Mass Clean Energy Center

METER NUMBER: 02212913 NEXT SCHEDULED READ DATE: Dec 2
SERVICE PERIOD: Oct 1 - Nov 2 NUMBER OF DAYS IN PERIOD: 32
RATE: General Service - Demand G-2 VOLTAGE DELIVERY LEVEL: 0 - 2.2 kv

Customer Charge		19.56
Distribution Charge	0.00699187 x 16640 kWh	116.34
Transmission Charge	-0.00071 x 16640 kWh	-11.82
Energy Efficiency Chg	0.01898 x 16640 kWh	282.55
Distribution Demand Chg	6 x 51.2 kW	337.20
Energy Efficiency Chg	0.00433 x 16640 kWh	72.05
Renewable Energy Chg	0.0006 x 16640 kWh	8.32
Total Delivery Services		\$ 791.20



Electric Usage History

Month	kWh	Month	kWh
Nov/20	14803	Jul/19	14695
Oct/20	16892	Jun/19	20640
Sep/20	20452	Aug/19	29710
Aug/20	18005	May/19	22382
Jul/20	19102	Oct/18	18720
Jun/20	14800	Nov/18	18640
May/20	15840		



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Understanding Your Electric Bill: Demand

- Demand (kW)
- Based upon maximum 15 minute time period for each month
- Charges vary by provider
- Specific efficiency measures can target demand

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Billed Demand Last 12 months

Minimum	40.4
Maximum	96
Average	66.666



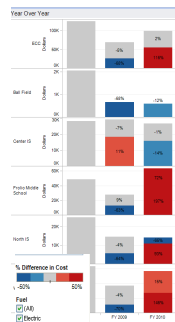
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Why Track Energy Usage?

- Save energy
- Minimize demand charges
- Provide information to management
- Budget planning
- Create and track energy-related goals
- Prioritize specific buildings or uses
- Plan for renewables



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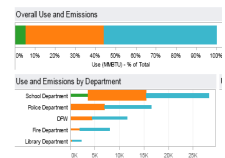
MassEnergyInsight

- FREE online tool for MA cities, towns, RSD & WTP
- 183 towns and 304 current users
- Provides:

- Automated electronic download of utility data
- All energy costs and accounts in one place
- Standardized and custom reporting

- Use to:

- Identify least efficient buildings
- Track your energy use/savings by department, building, or fuel type
- Generate GHG emissions reduction reports



www.massenergyinsight.net



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Tracking Your Energy Usage: Spreadsheets

- Oil
- Propane
- Gasoline
- Competitive supply costs
- Water flow

	ACCOUNT	Delivery Date	Grade	Gallons	Cost (\$)	per gallon
20 02	Junior High	01/25/09	2	7,000	\$13,602.24	1.9432
		03/08/09	2	7,000	\$13,600.30	1.9429
		06/01/09	2	4,000	\$7,771.60	1.9428
		01/26/07	2	7,000	\$13,051.28	1.8842
		02/21/07	2	7,000	\$13,051.28	1.8842
		04/20/07	2	7,000	\$13,049.40	1.8842
		12/17/07	2	7,000	\$13,329.80	2.7814
		01/29/08	2	7,000	\$13,436.80	2.6624
		03/11/08	2	7,000	\$12,140.80	2.1794
		02/03/09	2	6,000	\$9,142.20	1.5237
20 03	Middle School	1/25/09	2	7,000	\$13,604.18	1.9432
		3/14/09	2	7,000	\$13,600.30	1.9429
		6/1/09	2	3,000	\$5,828.70	1.9429
		2/14/07	2	7,000	\$13,054.56	1.8842
		4/24/07	2	7,000	\$13,053.10	1.8842
		1/17/08	2	7,000	\$16,847.10	2.6545
		3/1/08	2	7,000	\$10,801.30	2.3888
		2/11/09	2	7,000	\$10,721.90	1.5317



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Next MassEnergyInsight Trainings

MONTH	TOPIC	DATE/TIME
January	Registration deadline MassEnergyInsight Introduction (required for new users)	Tuesday, January 4, 2011 Tuesday, January 11, 2011 2:00 PM to 3:15 PM
February	Registration deadline MassEnergyInsight Introduction (required for new users) Follow-up Q & A (recommended for new users; open to any authorized user)	Wednesday, February 2, 2011 Wednesday, February 9, 2011 10:00 AM to 11:15 AM Wednesday, February 23, 2011 10:00 PM to 11:15 AM
March	Registration deadline MassEnergyInsight Introduction (required for new users)	Monday, March 7, 2011 Monday, March 14, 2011 6:30 PM to 7:45 PM



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Making the Most of An Energy Audit

1. Track your energy usage
- ➔ 2. Discuss your goals, resources and potential funding sources
3. Meet with your Program Administrators/utilities to define the audit services
4. Conduct an audit
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6. Implement



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Discuss Goals, Resources & Funding

- Goals
 - How many buildings?
 - How deep?
 - "Low-hanging fruit" or comprehensive?
 - Timeframe?
- Resources
 - Internal
 - Community
 - Program Administrators/Utilities
- Funding
 - Capital plan allocations
 - Ability & willingness to incur debt
 - Performance contract
 - Program Administrator incentives
 - State / Federal grant programs



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No and Low-Cost Measures

- Programmable thermostats and time of temperature setbacks – turn off 30 minutes before vacancy
- Operations & Maintenance: function as designed
- Computer and monitor power management freeware
- Attack Phantom Loads
- Install vending misers
- Turn off equipment
- Lighting
 - Replace any mercury vapor streetlights
 - Replace desktop incandescents with CFLs
 - Convert to LED exit signs and traffic signals



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Poll

- To minimize our costs, we should install solar panels, then address energy efficiency.
- True
- False



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Efficiency First



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Making the Most of An Energy Audit

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Program Administrators



Electric

National Grid
NStar
Unitil
Cape Light Compact
WMECO

Gas

National Grid
NStar
Unitil
Columbia Gas
Berkshire Gas
New England Gas

Contact your Account Executive for an audit or details on incentives

www.masssave.com



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Utilities Provide Your Energy – So Why Would They Help You Use Less?



Green Communities Act of 2008:

- Requires all investor-owned electric and gas utilities and municipal aggregators to procure all cost-effective energy efficiency and demand reduction resources
- Energy Efficiency Program Administrators develop three-year plans with programs and goals
- 2010 – 2012 plan: Program Administrators will invest \$2.1 billion in energy efficiency for a net savings of \$3.8 billion



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Meet With Your Program Administrators to Define Audit Services

Who Should Attend?

- Energy manager/champion
- Director of Facilities/Operations
 - Schools
 - Municipal
 - Water/Wastewater Treatment Plants
- Financial person
- Program Administrator/Utility representatives/account executive
- Green Communities Regional Coordinator



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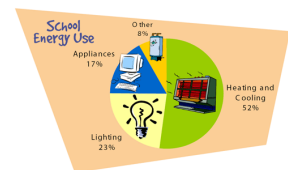
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Meet With Your Program Administrators to Define Audit Services

Agenda

- Overview energy use
- Identify priority buildings
- Review history of improvements
- Process & timeframe
- Next steps



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Cost of an Audit

- **Walk-Through Audit (Level 1)**
 - Direct Install through Program Administrators is free audit (<300 kW)
 - Prescriptive measures such as lighting, refrigeration, programmable thermostats
- **Energy Audit (Level 2)**
 - Whole Building Assessment from Program Administrators
 - \$4,000 - \$6,000 for each building, 50% cost-share from Program Administrators may be available
 - More comprehensive: mechanical, EMS, HVAC, heating systems
 - More specific estimates of costs and savings
- **Process Audit/Technical Services (Level 3)**
 - Wastewater & Drinking Water Treatment Plants
 - \$5,000 - \$50,000, cost-share from Program Administrators may be available
- **Investment Grade Audit**
 - Through a Performance Contract
 - Multiple Buildings
 - \$10,000s if Performance Contract is not signed



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Poll Question

My town can't get an energy audit because it has electricity provided by a Municipal Light Plant.

- True
- False



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Energy Efficiency for MLP Communities

- Work with your Municipal Lighting Plant (MLP)
- Address gas uses if you have a gas Program Administrator
- Perform own low and no-cost measures
- Use community resources to identify higher cost opportunities
- Investigate a Performance Contract
- Pay for an energy audit; will be able to use pre-approved vendors for energy services on Comm-Pass (www.comm-pass.com)



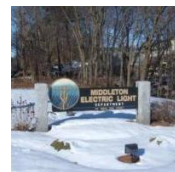
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DOER is Working with MLPs

- Met with Mass Municipal Wholesale Electric Companies to discuss their efficiency programs
- Two MLPs currently provide data for MassEnergyInsight; more can – just ask!
- Continuing outreach at all MLPs



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Making the Most of An Energy Audit

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- ➔ **4. Conduct an audit**
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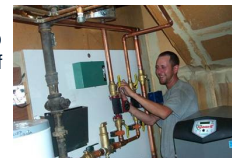
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Working with an Auditor

- Complete Program Administrator application, if appropriate
- Operations person present to share knowledge of history of upgrades, renovations, improvements and current operating characteristics
- Provide full access to all buildings on day of audit
 - if audit schools during vacations, you may lose the opportunity to see the school & its systems in use



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Sample Audit Summary

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
				Cost (\$)	Electrical (kWh)	Fuel Oil (Gal.)	Nat. Gas (CCF)	Other LPG (Gal.)	Total (MMBtu)	Electrical (\$)	Fuel Oil (\$)	Nat. Gas (\$)	Other LPG (\$)	Total (\$)	Payback (yr)
2	Building	Project													
3	Library	lighting upgrades		281	1,750	0	0	0	6.0	210	-	-	-	300	0.9
4	Library	motor controls		1,153	730	887	0	0	125.8	88	2,680	-	-	2,768	0.4
5	town hall	control system		430	0	0	147	0	15.1	-	-	232	-	232	1.8
6	town hall	building envelope		12,488	0	0	1,248	0	128.3	-	1,968	-	-	1,968	6.3
7	town hall	occupancy sensors		471	624	0	0	0	2.1	75	-	-	-	75	6.3
8	town hall	lighting upgrades		726	1,058	0	0	0	3.6	127	-	-	-	144	5.0
9	WWTP	heating system		198,777	62,134	6,134	0	688	1,189	8,084	18,402	-	1,300	19,252	10.3
10	WWTP	occupancy sensors		3,514	4,403	0	0	0	15.0	572	-	-	-	572	8.1
11	WWTP	variable speed drive		5,630	60,583	0	0	0	207.0	7,876	-	-	-	7,876	9.7
12	Building	building envelope		13,835	3,954	0	1,252	0	142.5	475	-	1,816	-	2,291	6.0
13	school	control system		7,385	0	0	3,793	0	390.7	-	5,462	-	-	5,462	1.3
14	school	building envelope		28,741	0	0	4,684	0	482.4	-	6,745	-	-	6,745	4.3
15	school	occupancy sensors		16,721	31,824	0	0	0	108.3	4,233	-	-	-	4,233	4.0
16	Senior Center	scope audit items		300	0	0	0	0	0.0	-	-	-	-	-	0.0
17	TOTALS			199,753	43,742	7,621	11,121	688	2,734	5,872	21,062	18,223	1,300	42,935	4.7



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Program Administrator Incentives

- Custom
- Prescriptive
 - Lighting systems & controls
 - High-efficiency heating equipment
 - High-efficiency gas water heaters
 - Chillers
 - Energy management systems
 - High-efficiency air compressors
 - Gas-fired commercial kitchen equipment
 - Motors
 - Variable speed drives



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Making the Most of An Energy Audit

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What Not to Do With An Energy Audit



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Create a Plan

- Meet with the auditor, Program Administrators, account executive and your finance person to understand all recommendations
- Decision factors:
 - Simple payback
 - Funding & incentives availability
 - Cost of inaction
 - Coordination with maintenance and capital plans
- Make your case by knowing your audience



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Create a Plan: Harvard's Energy Reduction Plan

Building	Project	Project Cost	Alternate Funding	Alternate Funding Source	Cost to Harvard	Annual Savings	Pay Back (Years)	Est Annual Energy Savings (MMBtu)	Date	Status
PPIII	New Boiler/Runners - Core to Gas	\$ 30,300	\$ -	None	\$ 30,300	\$ 19,000	3.2	1,007	Dec-03	Complete
	Boilerfeed Lighting Efficiency Upgrade	\$ 114,488	\$ 88,229	USDA	\$ 26,259	\$ 19,035	2.4	494	Aug-03	Complete
	USC Lighting Efficiency Upgrade	\$ 30,360	\$ -	USDA	\$ 30,360	\$ 6,753	4.5	174	Feb-03	Complete
	Subtotal							1,675		
Town Stages	Lighting Efficiency Upgrade	\$ 22,610	\$ 16,757	USDA	\$ 5,853	\$ 4,518	1.6	133	Oct-10	CPH, Town Hall, Oak Library, Public, Brimfield House
	Mechanical Upgrades - DCV, BAS, Fan VSDs	\$ 139,223	\$ 42,212	USDA	\$ 97,011	\$ 48,033	2.0	2,057	Dec-10	Harvard Medical School
	Boilerfeed High School Mechanical Upgrades - Options - Boiler HP VSDs, Pneumatic Controls	\$ 45,455	\$ 17,400	USDA	\$ 28,055	\$ 13,693	2.1	600	Dec-10	Harvard Medical School
	Harvard Elementary School Boiler HP VSDs and Digital Controls	\$ 53,785	\$ 16,300	USDA	\$ 37,485	\$ 4,668	7.0	122	Dec-10	Harvard Medical School
PPIII	Harvard Elementary School Mechanical Upgrades - DCV, New BAS, Retrocommissioning, RTU	\$ 150,000	\$ 30,000	USDA	\$ 120,000	\$ 25,000	2.8	1,168	Oct-10	Harvard Medical School
	Fire Station	\$ 6,000	\$ -	USDA	\$ 6,000	\$ 3,000	2.0	149	Oct-10	Harvard Medical School
	Town Hall & Fire Station	\$ 3,300	\$ -	USDA	\$ 3,300	\$ 1,650	2.0	180	Oct-10	Harvard Medical School
	Heating Controls - Toward Heat Cycles, Fire Station Door Timer & Thermostats	\$ 3,300	\$ -	USDA	\$ 3,300	\$ 1,650	2.0	180	Oct-10	Harvard Medical School
PPIII	Harvard Medical School Mechanical Upgrades	\$ 17,000	\$ -	USDA	\$ 17,000	\$ 11,460	2.3	458	Oct-10	Harvard Medical School
	Public Library	\$ 10,000	\$ -	USDA	\$ 10,000	\$ 5,000	2.0	244	Oct-10	Harvard Medical School
	Town Hall	\$ 3,300	\$ -	USDA	\$ 3,300	\$ 1,650	2.0	180	Oct-10	Harvard Medical School
	Subtotal							683		



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Poll

- How much do you agree with this statement:
We have a fiscal crisis and cannot afford to address energy efficiency right now.
- A. Completely
- B. A little
- C. Not at all



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ENERGY STAR® Cash Flow Opportunity Calculator



- How much new energy efficiency equipment can be purchased from the anticipated savings?
- Should this equipment purchase be financed now or is it better to wait and use cash from a future budget?
- Is money being lost by waiting for a lower interest rate?

http://www.energystar.gov/index.cfm?c=business.bus_internet_presentations_selfguided



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Funding



Build Support:

- Operating budget

Implement Specific Measures:

- Capital plan
- Program Administrator incentives

General Overhauls:

- Performance Contract
- On-bill/Third-party financing
- Municipal bond
- Program Administrator incentives
- State / Federal grants



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How to Build Support for Energy Efficiency

- Join the half of Mass municipalities that have had an energy audit since 2008
- Save money
- Demonstrate community fiscal responsibility
- Save municipal jobs
- Increase energy independence and security
- Create local construction jobs
- Improve occupant/worker comfort and productivity



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Marshfield Reaches Out

Visual Tour of the Marshfield Fire Station



Marshfield Fire Station
Built 1950's

Then Project Manager Mark Helinski gives a tour of the energy issues facing the Marshfield Fire Station



<http://www.blip.tv/file/4036590>



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Making the Most of An Energy Audit

- Track your energy usage
- Discuss your goals, resources and potential funding sources
- Meet with your Program Administrators/utilities to define the audit services
- Conduct an audit
- Create a plan
- Implement**



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Reinvest in Energy Efficiency



- Energy efficiency is a continual process
- Reinvestment validates participants' commitment
- Account for incentives
 - To general fund?
 - To participating department(s)?
- Plan to reinvest
 - Document your savings
 - Share your success story
 - Revolving loan fund
 - Rewards to departments



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Town of Reading Massachusetts



- Promote your success & inspire your community
- Reading:
 - Energy Performance Contract
 - Public education and awareness campaigns
 - Blog
 - Lighting audits by schoolchildren
 - Home energy conservation competition for middle schoolers

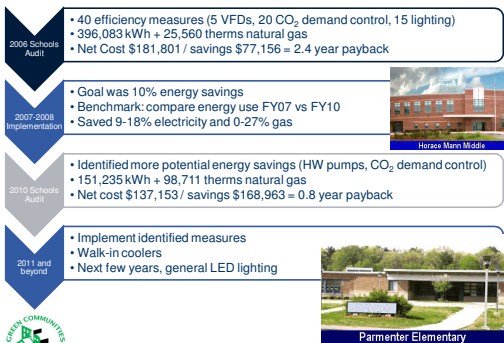


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Franklin: Re-investing in EE



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How DOER Can Help



1. Track your energy usage
MassEnergyInsight
2. Discuss your goals, resources and potential funding sources
Share success stories and lessons learned
3. Meet with your Program Administrators/utilities to define the audit services
Regional Coordinators attend kick-off and action meetings
4. Conduct an audit
Information on common measures
5. Create a plan
Energy Management Procurement Assistance
6. Implement
Green Communities Grants



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DOER & DEP Contacts

- Performance Contracts:
 - Eileen McHugh@state.ma.us
- Drinking Water & Wastewater Treatment Plants:
 - Michael DiBara at MassDEP: Michael.DiBara@state.ma.us
 - Aimee.Powelka@state.ma.us
- DOER Regional Coordinators:
 - Southeast: Seth.Pickering@state.ma.us
 - Northeast: Joanne.Bissetta@state.ma.us
 - Central: Kelly.Brown@state.ma.us
 - Western: Jim.Barry@state.ma.us



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Resources

- Program Administrators
 - www.mass.gov
- EPA Energy Star
 - Local Government webcasts
 - <http://www.epa.gov/state/localclimate/web-podcasts/local-webcasts.html#1>
 - Best Practices Checklist
 - http://www.energystar.gov/ia/business/downloads/BP_Ch_ecklist.pdf
 - Cash Flow Opportunity Calculator
 - http://www.energystar.gov/index.cfm?c=assess_value.fina_ncal_tool
 - Financing Energy Efficiency
 - http://www.energystar.gov/index.cfm?c=business.bus_inte_mnt_presentations_solidpdf
 - Computer Power Management
 - www.energystar.gov/powermanagement
- Northeast Energy Efficiency Partnerships O&M Guide for Public Schools
 - <http://neep.org/public-policy/buildings/high-performance-schools-omguide>
- Department of Energy ARRA Webcasts
 - <http://www1.eers.energy.gov/wip/solutioncenter/webcasts/default.html>



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THANK YOU!

- Aimee Powelka's contact information:
Aimee.Powelka@state.ma.us / 617-626-7356
- The webinar was recorded and will be available for viewing at your convenience on our website at:
www.mass.gov/energy/greencommunities
- The slide presentation will also be posted at:
www.mass.gov/energy/greencommunities



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